Remarks

The drawing has been objected to because it contains blank boxes and other shapes that lack a suitable legend. Each blank box has been provided with a suitable legend that is supported in the specification in the section beginning on page 8 line 31 and continuing to page 9 line 12. A replacement drawing is attached to this paper. The corrections to the drawing involve only sheet 3 and therefore it alone has been submitted as a replacement sheet. Since suitable legends have been provided it is respectfully requested that the objection to the drawing be withdrawn.

Claims 1, 2, and 4 through 6 have been rejected under 35 USC § 103(a) as unpatentable over US patent 5,365,362 A (Gnauck). The rejection of these claims is respectfully traversed. It is the applicant's understanding that the Examiner's rejection is based on the portion of Gnauck beginning in column 14 line 43 and continuing to line 62 fully anticipates the applicant's invention with the exception that there is no disclosure of a zero dispersion wavelength in the range 1260 to 1360 nm. It is the applicant's further understanding that the Examiner's rejection states that this undisclosed portion is made obvious by the formula and accompanying text found at Gnauck column 9 line 33 through column 10 line 67.

The applicant's invention relates to errors resulting from use of a multi-longitudinal mode (MLM) laser in short haul optical systems. In particular the applicant has found that errors related to use of a MLM laser in optical systems having an operating optical fiber length less than 20 Km may be substantially avoided by employing a specific expedient. In particular, a length of fiber in addition to that of the operating system is employed. This additional fiber has a zero dispersion in the wavelength range 1260 to 1360 nm and, at the central operating wavelength of the system, has the property that the first derivative of dispersion with respect to wavelength is of opposite sign to that of the system operating fiber. That is, in an optical communications system that 1) has less than 20 Km between a provider and an end user and uses 2) an MLM laser, significant noise reduction may be achieved by adding additional fiber having 3) zero dispersion in the range 1260 to 1360 nm and having 4) a first order dispersion of opposite sign relative to that of the operating fiber.

The cited portion of Gnauck discloses none of these four elements. As to the first element, the Gnauck system has a length of 1062 Km. (See column 14 line 56 of Gnauck and page 7, lines 9 through 12, where fiber length is defined as the distance from the service provider to end user.) As to the second element, there is absolutely no disclosure that an MLM laser is employed in the system of Gnauck. Indeed for long haul systems MLM lasers are typically inappropriate because of the unavoidable and unacceptable level of mode-partition noise as discussed in Agrawal et.al. (A copy of Agrawal et.al. was supplied to the Office in conjunction with the Information Disclosure Statement filed with the application.) As to element 4, Gnauck notes at column 14 lines 53 and 54, second order dispersion, i.e. the first derivative of dispersion with wavelength, for the entire system was 0.08 ps/Km-nm^2. (Gnauck defines the term "second order dispersion" at column 3 lines 10 through 16 to denote the first derivative of dispersion with respect to wavelength.) Gnauck does mention systems having different "second order dispersion" signs at column 10 lines 14 through 34 but in the context of a long haul single longitudinal mode laser operating at 1500 nm. Finally, as to element 3, rather than the range 1260 to 1360 nm, Gnauck is totally focused on optical communications systems operating in the range around 1500 nm as disclosed at column 2 lines 60 through 64 where it is stated:

> Midsystem optical phase conjugation has extended the bit rate distance product achievable in the anomalous dispersion region at 1.5 micrometers wavelength of the conventional single-mode fiber which makes up much of the world's existing fiber communication channels. [Emphasis added.]

Additionally the formula found in Gnauck at column 9 line 40 merely relates a fiber length L2 to the fiber length L1 (two portions of Gnauck's system) based on other parameters. The formula does not involve calculation of the zero dispersion wavelength and does not even use the zero dispersion wavelength in the calculation. Thus the portion cited by the Examiner does not change Gnauck's explicit teaching concerning use of a system operating at 1500 nm.

Thus the portion of Gnauck upon which the rejection under 35 USC § 103 rests does not disclose MLM lasers; does not disclose an operating wavelength in the range 1260 to 1360 nm; does not disclose an additional fiber having suitable second order

dispersion in conjunction with the other necessary parameters; and explicitly discloses a system 50 times longer than that allowable for the applicant's approach. It is therefore respectfully submitted that Gnauck does not make the applicant's invention obvious.

Claim 3 has been objected to as being dependent upon a rejected base claim. The applicant believes that this base claim is allowable as explained above. However, if the Examiner maintains the rejection of claim 1, the applicant will rewrite claim 3 in independent form to remove the objection.

It is respectfully requested that in view of the amendments to the drawing and above remarks that the rejection and objection be withdrawn and that the application be allowed.

Respectfully submitted,

Manyalibo Joseph Matthews

By Bruce Schneider
Bruce S. Schneider
Attorney for Applicants
Reg. No.: 27949
908-647-7688

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Bruce S. Schneider
1153 Long Hill Road
Stirling, New Jersey 07970-1007